

REPLACEMENT SHEET

Reply to Office Action dated September 10,

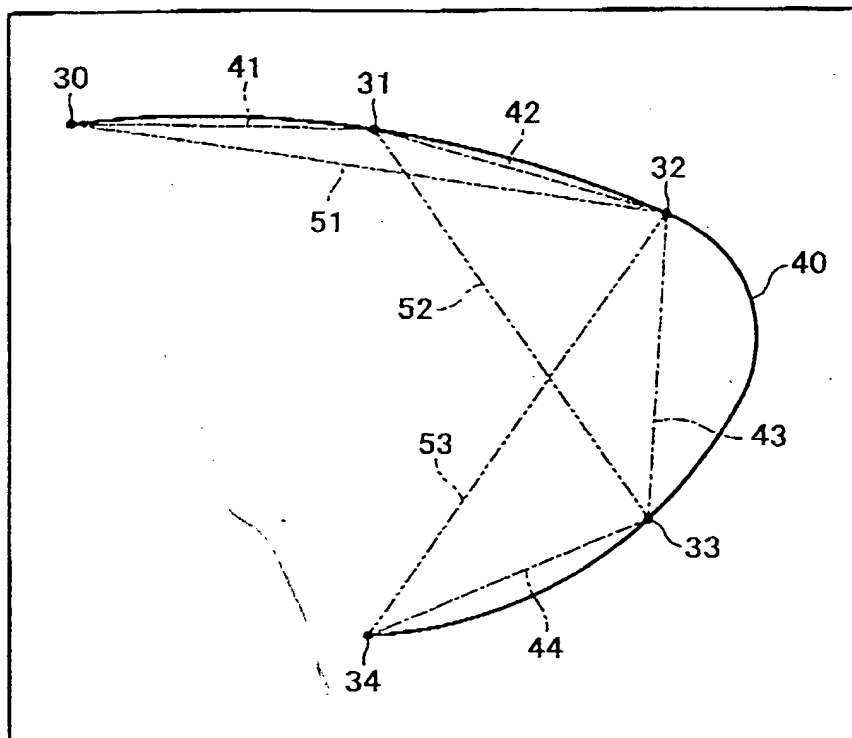
2004

Application Serial No.: 09/972,200

Attorney Docket No.: 8215.129

FIG.1

Derivation of numerical data of minutia ridge shape





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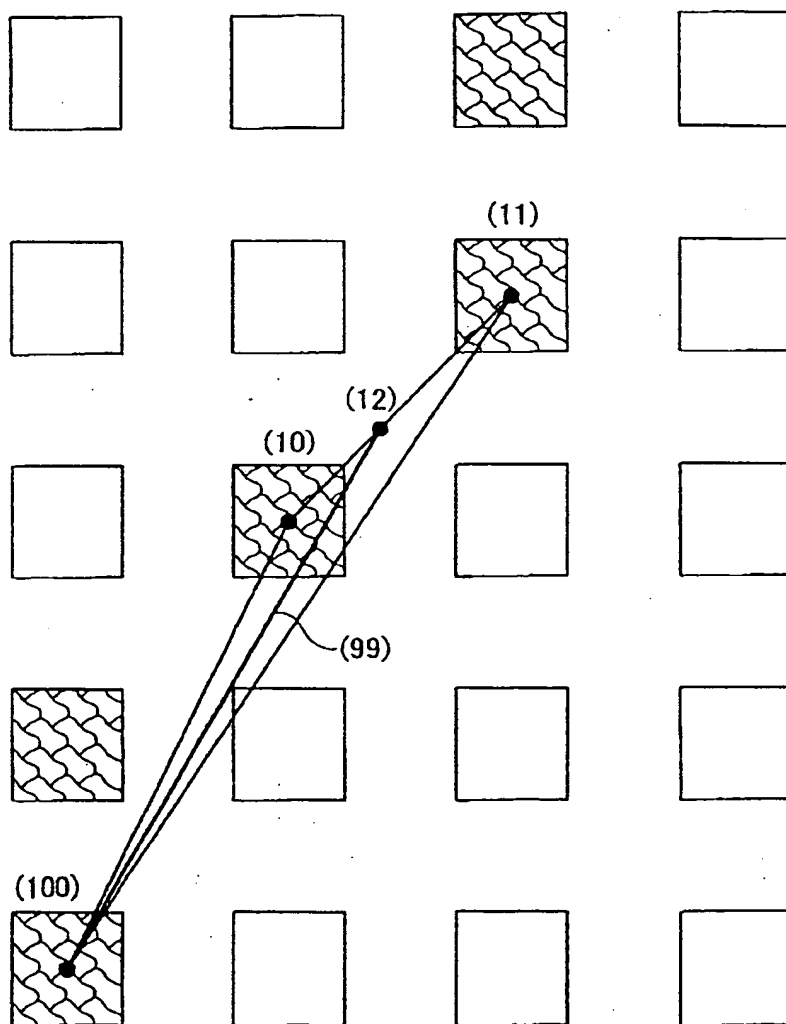
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FIG.3

Principle of calculating approximate coordinates of measure points located between pixels





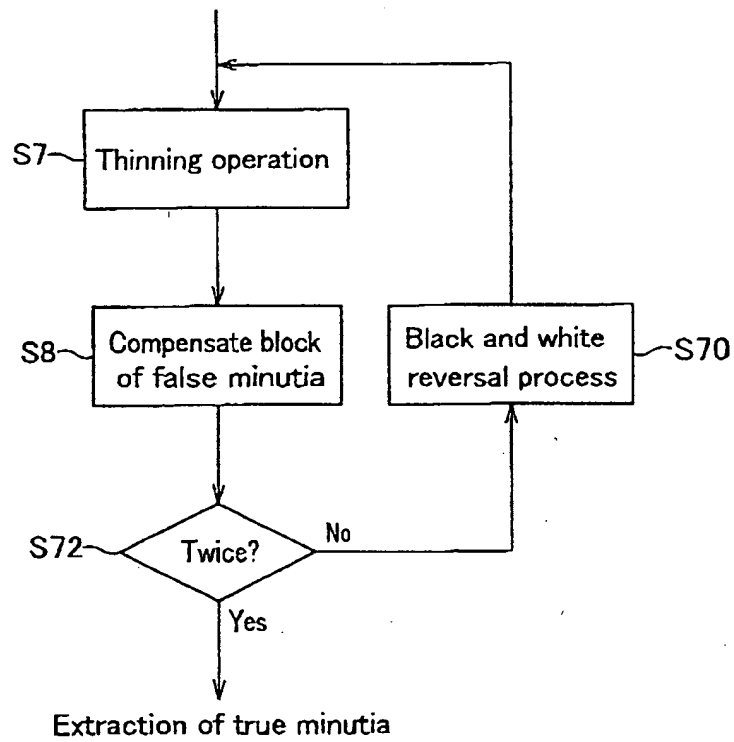
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FIG.5





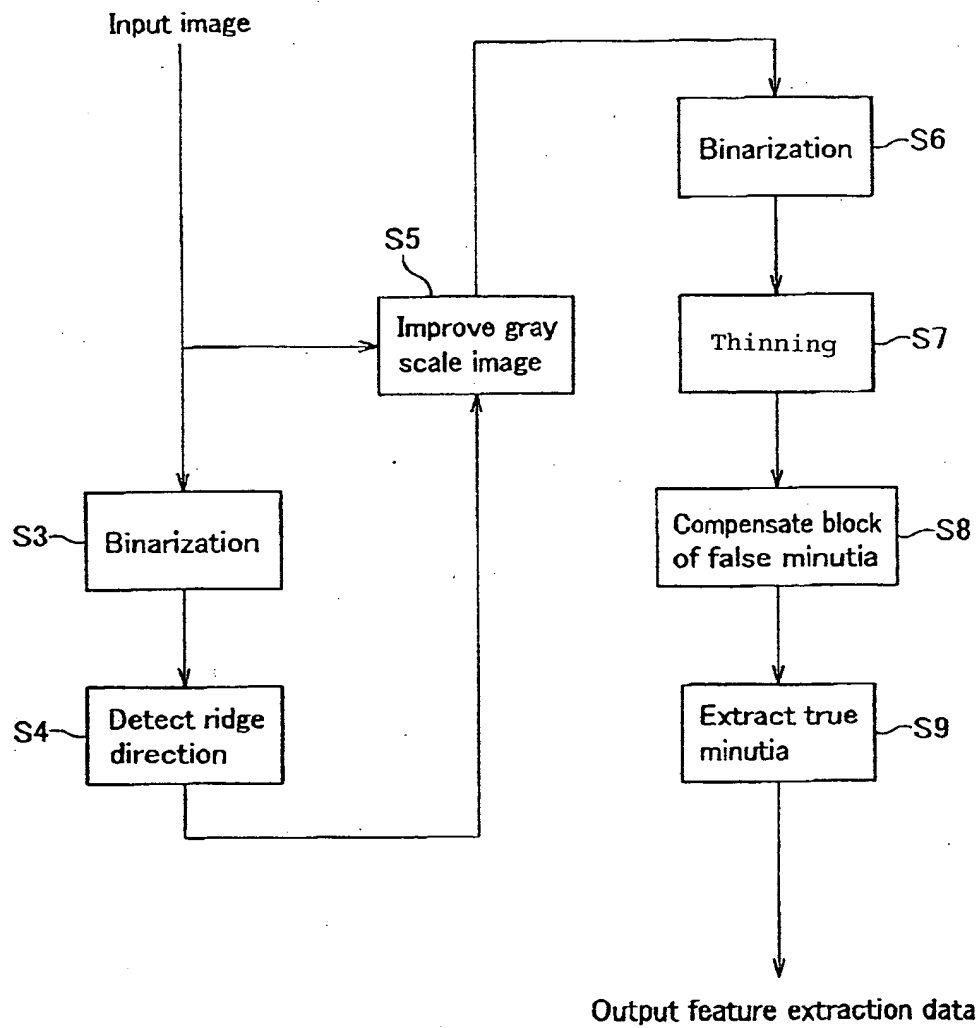
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FIG.6





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FIG.8

Extraction of minutia by thinning and reverse operations between black and white over black

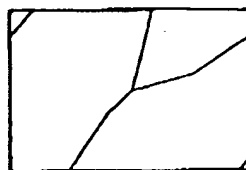
(a) Black and white image before treatment



Thinning



(b) Intermediate extracted minutia



Reverse operation



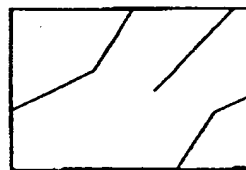
(c) Black and white reversal image



Thinning



(d) Extracted minutia after final treatment



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FIG. 9

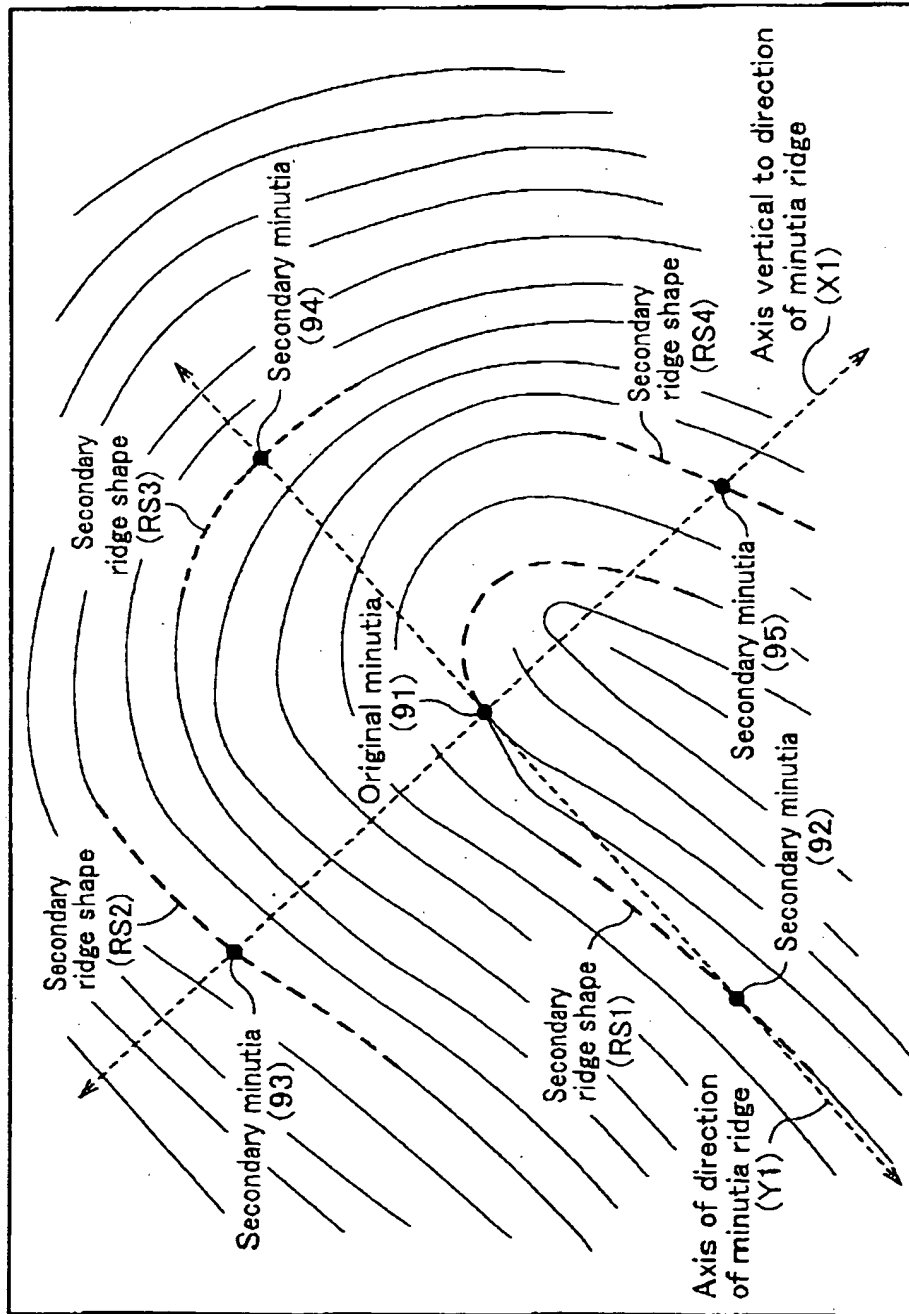




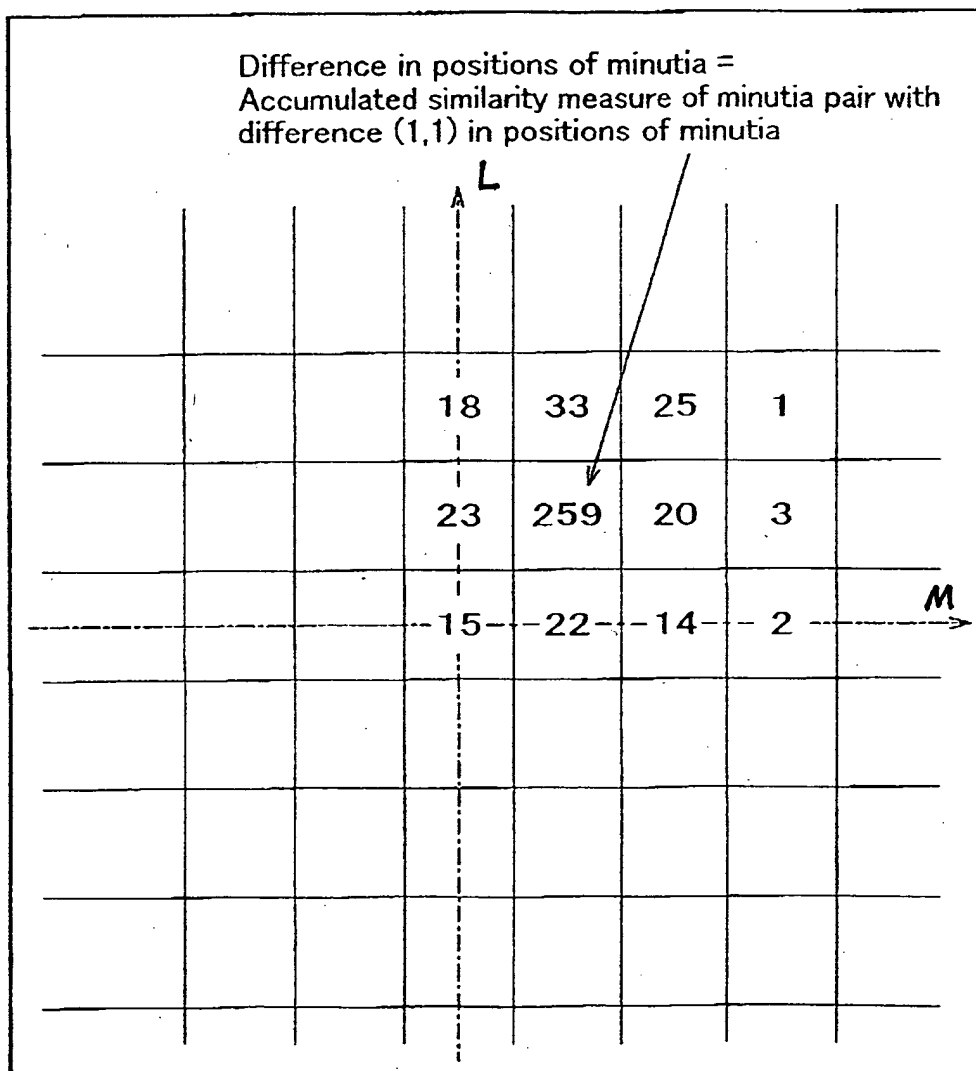
FIG.11

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FIG.13

Algorithm for finger authentication system

